the eclipse during its totality, which gave the promise of settling, once for all, the hitherto much-mooted question as to whether the red prominences belonged to the sun, or were attributable to a different origin. On his return home he devised a micrometer for the due measurement of these remarkable phenomena, and in conjunction with other photographs taken by Padre Secchi, at a station some 250 miles distant from Riva Bellosa, he succeeded in allocating these singular fiery prominences beyond question, in the gaseous envelope which surrounds the sun. The results of his researches were embodied in the Bakerian Lecture delivered before the Royal Society in 1862. Perhaps it is not too much to say that these efforts laid the foundation of that wonderful structure of solar physics which is daily enlarging our knowledge of the true nature of the sidereal universe.

In 1873 the Observatory at Cranford was dismantled, on the occasion of De la Rue's removal from his comparative seclusion there to his residence in London. The reflector, with all its numerous and valuable accessories, was presented to the University of Oxford, and by this noble gift it was enabled at length to establish an efficient Astronomical Observatory at a place of learning where Halley and Bradley had flourished and taught nearly two centuries before. The instrument was erected in completeness at De la Rue's sole expense, and for several years he defrayed the cost of the additional assistant necessary for its utilization.

Oxford has at no time been backward in acknowledging with gratitude all efficient services rendered in behalf of the studies of the place. Accordingly, on De la Rue was conferred the rare honour of the full degree of M.A., by which he became a member of Convocation, while New College also incorporated him among her Society of Wykehamists, and made him a member of their common room.

We have occasion to know that it was a source of gratification to De la Rue to feel assured that his generous gift was utilized to the full by his old friend the present Professor of Astronomy, and specially in the direction which himself had inaugurated. Moreover, when a few months ago he saw the marvellous results produced by Mr. Roberts in his photographic pictures of nebulæ, secured by a four hours' exposure, he gave directions for the additional mechanism requisite for the production, as he hoped and believed, of similar pictures by his own now ancient instrument. Such is the solidity of the original mounting, that at this moment it is finally placed on a par, in respect of accurate movement, with any known instrument; but he did not live long enough to watch the progress of the experiment. Nor does this end the catalogue of his gifts to the University. When he heard of the projected scheme inaugurated by Admiral Mouchez, the Director of the Paris Observatory, for completing a photographic chart of the entire sidereal heavens, he placed a considerable sum of money in the hands of the Vice-Chancellor in order to defray the cost of the large photographic telescope necessary for taking a part in this great enterprise. The University of Oxford is not an ephemeral institution, and De la Rue's acts of generosity will remain inscribed upon her annals.

While he was thus watching with intense interest the uses made at Oxford of the work of his renovated instrument, he was himself engaged in a new enterprise of his own. Whether the recollection of what his friend Gassiot had done some twelve years before at Clapham—how, when he returned from his City work in the early evening, he retreated down to his laboratory, furnished at incredible labour and expense, and there tried to investigate the nature and origin of the electric discharge, and especially the strangely beautiful luminous striæ observed in tubes partially exhausted, visited now and then, while at work, by Faraday and other kindred spirits—whether or not this may have been the inducing cause, certain it is that De la Rue became fascinated by the same phenomena, and enamoured with the same pursuit. Possibly through a like scientific contagion, Spottiswoode also, in due course of time, endeavoured to wrest the same secret from Nature's hands. For years these three men worked and persevered in hope. None of them wholly succeeded and yet none of them wholly failed; each and all left finger-posts to guide some future and more fortunate research.

The space which can be here afforded to the memoir even of an illustrious man precludes more than a passing allusion to the honours and social distinctions which always accompany the efforts of a life such as Warren de la Rue's; and upon him they were accumulated in abundance. The abiding honour lies in the contemplation of the man. A career like his dignifies the daily life of a manufacturer, giving it an aim and an object apart from the accumulation of wealth; it humanizes, warms, and illuminates the absorbing abstraction of the solitary student; and it illustrates the fact of an Aristocracy of Nature.

THE PHILOSOPHY OF MYSTICISM.

The Philosophy of Mysticism. By Carl du Prel, Dr. Phil. Translated from the German by C. C. Massey. 2 Vols. (London: George Redway, 1889.)

WE own to a certain mistrust when we are asked to accept goods under a trade-mark of mysticism; just as we have a most Levitical desire to pass by on the other side when we encounter the latest lucubrations of the circle-squarer, the absolute harmony of Genesis and geology, or when the last new theory of the soul is extended before us, "All Danaë to the stars." Now the philosophy of mysticism contains the latest of soul theories, or rather it is an old theory—a very old theory indeed—which has been newly adapted and furbished up and fitted with the very latest adjuncts which the outskirts of modern science can supply, so that it is to all intents and purposes just as good as if it were altogether new and original. Do not let us be misunderstood: both author and translator act in the strictest good faith. There is no false pretence about the matter. The whole work is perfectly ingenuous. The antiquity of the central idea is not in dispute, but it is claimed for the author that he has essentially modified our conception of that idea, that he presents his matter from a new stand-point, which is enough in all conscience nowadays, and that he is the first to show, by systematic analysis and comparison, that somnambulism and its cognate states are not essentially abnormal or morbid, but are in truth a mere exaltation of ordinary sleep, that the faculties evinced in those states are incipiently manifested also in dream, and are even indicated, though still more indefinitely, in waking life. It is contended that in this way the whole dream-life is reclaimed from its presumed worthlessness for scientific and philosophical purposes.

A duality of person with a unity of essence is the theory which commends itself to Baron du Prel, and he has worked out with much skill and acumen the details of an hypothesis to which his evident earnestness induces us to accord a hearing even when we are compelled to dissent from his conclusions. This hypothesis will have none of science, falsely so called; it sets at nought the accepted views of the physiologist and the materialist, and is a new, if nebulous, gospel of transcendental existence and apparently limitless progression. Man's life is moulded by his conception of his relation to the world, and that conception the present work is to radically revise. Who can tell if in the twentieth century the acceptance of these mystical views may not transform the present eager, struggling, money-grubbing crowd into a fraternity of peaceful philosophers finding in the placid pleasures of catalepsy an efficient substitute for the excitement of a boom in copper and for the fevered gambling of the Stock Exchange?

The author is very hard in his strictures upon the feeble physiologist, the wicked materialist, and indeed upon the modern professors of science generally, whom he abandons to their "exact amusements," whilst he seeks "the true theory in the bare analysis of the process which takes place in memory," and it is really wonderful what a superstructure he raises on the basis of that analysis. His preliminary dig at contemporary men of science he follows up with cuts and thrusts at intervals, but his salient grievance is that one and all fail to conceive progress otherwise than on their existing plane, whereas true progress must be inevitably vertical. With the advent of experimental methods, we learn, the world of science believed itself to have discovered a means for the attainment of all available knowledge, but the belief is erroneous. Not only is science still very far from its goal, but with the completion of its existing tasks, new prospects will be opened in the vertical direction. Should science succeed in explaining the whole visible world, that explanation is only as to a *represented* universe, a secondary phenomenon, a mere product of our sense and understanding, leaving the true world untouched. The quality of our consciousness in its relation to that world has still to be considered, and by such a method alone can its true nature be in any degree discovered. The visible world undergoes qualitative changes in the generation of consciousness, for, since the vibration of ether is in consciousness light and atmospheric vibration sound, it is evident that we are not truly cognizant of things, but only of the modes in which our senses react upon them. Taking all which and much more besides into consideration, the author sums up the result of human thought on the world-problem by saying that "consciousness does not exhaust its object, the world," a remark somewhat analogous to that of the Danish prince who observed that "there are more things in heaven and earth than are dreamt of in our philosophy."

As the world is the object of consciousness, so is the *Ego* that of self-consciousness; and here, says the Baron, materialism still flatters itself with the hope of reducing all psychology to physiology. It is deceived: self-consciousness does not exhaust its object, but is as inadequate to the *Ego* as consciousness is to the world, and the *Ego* may as much exceed self-consciousness as consciousness is exceeded by the world. The degree of the excess, is, however, not absolutely constant, since, by the rise of consciousness in the biological process, the boundary between the conscious and transcendental worlds has been and will be continually displaced. Of being, other than representation, we know nothing, and spirit is the primary and the real, for were its perceptive faculty changed, the whole material world of representation would be transformed; a clear demonstration that the represented world is a mere creature of the spirit. Behind consciousness is the ultimate being of which that consciousness is but the reflection, and as this ultimate being is beyond consciousness the Baron terms it the unconscious. This unconscious may either lie immediately behind the physically conditioned consciousness, or may be so indefinitely removed as to allow of an intermediate root of conscious individuality which is only relatively unconscious for the organism of sense. The author finds such an intermediary in his so-called psychophysical threshold of sensibility, which is the shifting barrier between the unconscious and self-consciousness. He conceives a dualism of consciousness, the division of two "persons" in one subject, but his conception differs from the popular conception of the dualism of soul and body, of matter and spirit, of Nature and supernatural. This dualism of consciousness is, with him, an intelligence which emerges with clearness and power just in proportion to the cessation of the organic functions with which the consciousness of waking life is associated; the two halves of our consciousness, divided by the movable threshold of sensibility, forming the subject which is an organizing as well as a thinking principle. The hypothesis of transcendental individuality co-existent with the earthly life and constructive of the organism by which consciousness is (from the earthly stand-point) dualized, necessitates the doctrine of pre-existence. Transcendental individuality implies a distinction from personal consciousness, and that the soul is not wholly plunged in the successive bodies which it constructs; the personal consciousness with its *Ego* being the mere partial and temporary limitation of a larger self, the growth of many seasons of earthly life.

The state of the individual after death is not precisely defined, but is suggested by the similitude of the smaller of two concentric circles expanding to the larger; the circumference of the inner circle being the organic threshold of sensibility, which death removes altogether, as it is already partially removed in such analogous states as sleep, somnambulism, &c. As in preoccupation the mind is concentrated to a focus, and subsequently expands to the limits of consciousness, so is earthly consciousness in death expanded to the boundary limits of the true *Ego*.

Transcendental subjectivity provides for continuity of consciousness, but the experience and whole activity of one of our objective life-times will be assimilated for results independent of those proposed by the contracted *Ego*, which bear but a minute proportion to the gradually accumulated content of the whole individual. The personal *Ego* must be brought to the point of view of the transcendental subject to which the mere happiness of that *Ego* is indifferent. What to us as persons are but high ideal motives may be alone of interest to the larger self which only maintains the organic personality for its own purposes. Such is Mr. Massey's analysis of the master's views, and it must be obvious that on this showing matters are decidedly in favour of the higher *Ego* which has, so to speak, got it all its own way. But since that exalted essence is, according to its moral nature, a product of development, the greater morality is not always on its side, for were that the case, terrestrial existence would have no educational value, and it is comfortable, therefore, to learn that our moral consciousness in earth-life can erect itself against its larger self, and may thus enrich the latter by the moral fruits of mundane existence; the struggle which takes place between the divisions of the subject being analogous to the process of Nature in its endeavour to expel disease, and drive whatever is morbid in an organism to the surface, or, to put it baldly, a species of spiritual measles. Such a theory, it is contended, fits the progress of the individual into the progress of the race, avoiding the waste of energy involved in the conception that the former is sacrificed to the latter, and supplies a wondrous harmony in which pessimism is subordinated to optimism.

The author is erudite, and he hails from the Fatherland; it is therefore not a matter for surprise that somewhat Shandean theories are exposed in sentences of wondrous construction. With these Mr. Massey has manfully wrestled; but, in his commendable desire to play the part of a faithful translator, he has at times given us such specimens of Teutonic English "as she is wrote" as render the good Baron's mysticism ten times more mysterious. We have read and re-read a passage, and a dozen perusals have left us still in doubt whether the meaning which the author and translator intended to convey were really grasped. Fidelity may be carried too far. At other times he who runs may read, and the author expresses his sentiments with an ingenuous frankness, as when he writes that "every criticism will be welcome which is adapted to advance the subject and myself."

Assuming that we have mastered the Baron's theory, an assumption we hesitate to make, we may place it before such of our readers as prefer a crude simile to the technicalities of metaphysics, in an illustration derived from natural history. Those who have visited the rock-pools of our coasts must have noticed the amusing little hermit crab (*Pagurus bernhardus*), who ensconces his soft unarmoured tail in the temporary shelter of an empty shell. He wriggles into his self-chosen habitation, and holds on to it with the pinchers with which his tail is provided, until he voluntarily leaves it before the approach of death. The hermit crab is the unconscious whole whose tail is tucked into the shell of self-conscious existence. As he emerges from it, or retires more completely, the amount of crab within the shell varies, the threshold of sensibility is shifted, and the shell benefits or suffers accordingly. The development of the moral nature of the subject, and its fitness for higher re-incarnation, are likewise shadowed forth in the fattening of the crab's tail, and his search for a roomy whelk-shell in place of the restricted covering of the modest periwinkle. Or, once again, the threshold of sensibility may be likened to the lid of the box from which the Jack of memory leaps, and upon the closure of which forgetfulness ensues.

It may be readily imagined that the author does not ask us to accept his theories unproven, and he has collected a mass of curious information from the most varied sources. Some of his anecdotes are oases of entertainment, which will, we fear, be missed by readers who do not, as we have done, peruse the volumes from cover to cover. As instances of our meaning, we may cite the case of a weak-minded youth upon whom all instruction in languages and science was thrown away, but who, after a fall on the head, became distinctly clever, intellectual, and highly cultivated, quickly seizing what he had been taught in vain before—a demonstration of the value of a box on the ears in the case of a stupid boy; the girl who, in her waking life, was reminded of her self-imposed somnambulistic treatment by the vision of a squirt; the military author who entered the barracks to take charge of the watch, in obedience to a dreamed order which he conceived to be a reality (had the case been one of neglect of a real order which he believed himself to have dreamt, we fear the court-martial would not have admitted the plea); or the wife who, subject to conditions of alternating consciousness, resented the presence of her husband, whom she treated with maidenly reserve. To prove the existence of a transcendental measure of time which is totally different from the normal, we are told of a flea-bite which occasioned a dream, concluding with a stab in the part of the body upon which the insect operated; of a pinch on the thigh, which caused the sleeper to imagine himself bitten by a wild beast; of De Quincey's opium dreams, which appeared to him to extend over vast periods of time; and of Mahomet, who, having knocked over a pitcher of water when translated by the Archangel Gabriel, viewed all things in heaven and hell, and held ninety thousand conferences with the Deity, returning to his still warm couch before the contents of the pitcher were expended. A somnambulistic girl exclaimed, "Where am I? I am not at home in the head. There is a strange struggle between the pit of the stomach and the head; both would prevail, both see and feel." So you see that "transcendental physiological functions seem to be parallel with corresponding changes in the ganglionic system." Authorities jostle in kaleidoscopic confusion; the "Novum Organum" standing cheek by jowl with the Bhagavadgita and the Vedas; whilst Aristotle and Proctor, Plato and Mrs. Crowe, Habakkuk, Galen, Plotinus, L. Oliphant, Daniel, Darwin, Kant, Olcott, and scores of others, jostle each other in ill-assorted series, but each with his contribution to the mosaic of marvels. On such a catena of evidence are based the two volumes; and, in spite of their waywardness, there is a thread of argument running through them which it would be unfair to the author to sunder by attempting an imperfect *précis* of his work, had we even the heart to impose it upon our readers. It has been said that, sooner or later, all books come into the hands of those for whom they were written, and there is no special reason for an exception in this case because the evidence for what is really a very beautiful theory fails to carry conviction to us. Doubtless our "threshold of sensibility" has gone wrong in some unaccountable way, and we have not enough of the Subject on this side of it to estimate the pearls of transcendentalism at their true worth. To the true adept, the work will doubtless prove wholly acceptable, and the author may take comfort in the reflection that "on this globe we serve an end, the attainment of which cannot be hindered, though all mankind conspired against it."

OUR BOOK SHELF.

A Treatise on Chemistry. By Sir H. E. Roscoe, F.R.S., and C. Schorlemmer, F.R.S. Vol. III. The Chemistry of the Hydrocarbons and their Derivatives; or, Organic Chemistry. Part V. (London: Macmillan and Co., 1889.)

THE present and fifth part of the "Treatise on Organic Chemistry" is devoted to an account of the benzenoid compounds containing eight or more than eight atoms of carbon, and brings the subject down to the group of the terpenes and camphors, including india-rubber and gutta-percha.

The various compounds are, as the title of the work denotes, grouped about the hydrocarbons from which they are derived. Thus we have the styrolene group, the cumene group, the cymene group, and so on.

The present instalment of the work also describes numerous instances of the interesting class of benzenoid compounds containing closed lateral chains in the ortho-position, *i.e.* with the two ends of the chain attached to carbon atoms which in their turn are directly united with one another. Such compounds are, for example, the indoles, the indazoles, isatin, carbostyril, and coumarin.

The subject of closed-chain compounds has of late years possessed a peculiar fascination for organic chemists, and the reason of this is not far to seek; for, apart from the fact that many of the closed-chain derivatives of benzene, such as coumarin, isatin, and indole, either occur in nature or are the immediate derivatives of naturally occurring compounds, many chemists believe that various important problems in chemical statics may ultimately be solved by the study of these compounds. At present chemists do not altogether know why, for example, closed lateral chains of carbon atoms should occur only in the ortho-position, and never in the meta- or para-position; why such closed lateral chains never contain less than five or more than six carbon atoms; and why it has never been found possible to unite any single polyad atom to two contiguous (ortho) carbon atoms in benzene, whilst in paraffinoid compounds such a union may be effected. But when these questions have been answered, something will be known concerning the local distribution of the affinities of the ultimate atoms; and meanwhile the ingenious hypothesis of Van 't Hoff with regard to the position of the affinities in the carbon atom is a step in the right direction, and affords what is possibly more than a merely provisional answer.

The authors have also given a very full account of Wallach's interesting researches on the terpenes, and here, as elsewhere, the information is thoroughly up to date.

The instructive historical introductions prefixed to the descriptions of important compounds and groups of compounds, referred to in our notices of previous portions of the work, are continued.

Solutions of the Examples in a Treatise on Algebra. By Charles Smith, M.A. (London: Macmillan, 1889.)

THE value of such a book is great both to teachers and students. The former, as we have often pointed out, have scant leisure for working out the more elaborate questions which nowadays have place even in elementary treatises, or scarcely care to refer to their notes, which are never, unless they are exceptionally methodical men, to be found when wanted; the latter are, by means of such a work as the one before us, in a great measure rendered independent of outside aid. Though Mr. Smith's solutions are marvels of compressed diction in many cases, they yet are, we can certify from an extended examination of all parts of the subject, expressed with all the clearness required. In a few cases two solutions are given; this is an advantage, for often we have found the second solution very suggestive. We have, then, here an excellent corpus of solutions of questions, which have been considered by many competent judges to be well arranged and well calculated to draw out a student's powers in this part of mathematics. We have come across a few typographical errors (there is one on the last page), but they are in most cases easily detected on following out the solution.

Applied Mechanics. By D. A. Low. (London: Blackie and Son, 1889.)

THIS is an excellent little text-book, treating of those parts of the subject which the Science and Art Department require for the elementary stage. There are, however, specially marked articles which may be read by advanced students.

The author has taken, as the ground-work of the book, the notes which he has used for many years in his classes with much success. Much care has been taken with those pages relating to mechanism. The diagrams are especially good, and the descriptive portions accompanying them are clear and concise. A striking and most useful feature will be found in the unusually large number of examples following each chapter, typical examples also being worked out between the articles.

The last half-dozen chapters are devoted to the nature, use, and strength of materials used for purposes of construction, and the different kinds of stress to which they may be subjected. The syllabus issued by the Department for teachers in this subject, followed by the examination papers of recent years, is appended. The book is one which can be recommended, and will no doubt be well received by teachers and students alike. G. A. B.

Northern Afghanistan. By Major C. E. Yate, C.S.I., C.M.G. (Edinburgh and London: Blackwood, 1888.)

IN this volume the author has brought together a number of letters written from the Afghan Boundary Commission, and he explains that they are now published in a connected form as a sequel to his brother Captain A. C. Yate's book, entitled "England and Russia Face to Face in Asia." A large part of the work relates chiefly to matters of political interest; but there are also excellent descriptions of the various places which Major Yate visited, and of the people with whom he came in contact. His account of Herat and the shrines in the neighbourhood is particularly good; and Balkh, of which he gives a plan, he depicts concisely and clearly. Of the desert from Andkhui to the Oxus he says it is about as hot and wretched a country as he ever saw. In this desert, wherever a few inches of mud and water were left, he used to see the white-breasted pintail sand-grouse coming to drink in small numbers; but with that exception he saw no sign of game. Lizards of all sizes and colours were to be seen. A lizard, some 2 or 3 feet long—"of a yellowish colour with red stripes"—seems to have especially attracted Major Yate's atten-